



CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

NABL - Accredited Laboratory as per ISO / IEC-17025 : 2005



Job No.: CTCE/BBMP/WNo.10/KRIDL/WMM/S-T/2014-15

04.11.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	Technical Manager, KRIDL, Bangalore.
Name of Work	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	04.11.2014



Result : Flakiness Index = 11.56%

Elongation Index = 13.84%

Result : Combined Flakiness & Elongation index 25.40%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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04.11.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Vidyanarayapura Sub Division, BBMP, Bangalore.
Agency	Technical Manager, KRIDL, Bangalore.
Name of Work	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyanarayapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	04.11.2014



Result : Flakiness Index = 11.28%

Elongation Index = 13.97%

Result : Combined Flakiness & Elongation index 25.25%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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QUALITY CONTROL REPORTS FOR
SEMI DENSE BITUMINOUS CONCRETE



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Job No.: CTCE/BBMP/WNo.10/KRIDL/QB(SDBC)/2014-15

19.11.2014

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	:	Technical Manager, KRIDL, Bangalore.
NAME OF THE WORK	:	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
SAMPLE ID	:	Bitumen
DATE OF TESTING	:	19.11.2014



The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	87	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	49	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	282	Min. 220

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Job No.: CTCE/BBMP/WNo.10/KRIDL/SDBC/AIV/2014-15



19.11.2014

Aggregate Impact Value

IS: 2386 Part IV

Client	Asst. Executive Engineer, Vidyanarayapura Sub Division, BBMP, Bangalore.
Agency	Technical Manager, KRIDL, Bangalore.
Name of the Work	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyanarayapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.11.2014

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	384	383	21.77
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	83	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	299	
4	Aggregate Impact value = percent fines $100 * (W_2 / W_1) \%$	21.61	21.93	

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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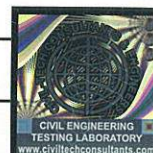


Job No.: CTCE/BBMP/WNo.10/KRIDL/SDBC/Shape_T/2014-15

19.11.2014

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	Asst. Executive Engineer, Vidyanarayapura Sub Division, BBMP, Bangalore.
Agency	Technical Manager, KRIDL, Bangalore.
Name of Work	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyanarayapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	19.11.2014



Result : Flakiness Index = 11.25%

Elongation Index = 13.61%

Result : Combined Flakiness & Elongation index

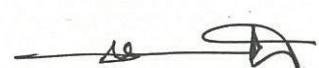
24.86%

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/WNo.10/KRIDL/SDBC/Stripping/2014-15

21.11.2014

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Client	Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	Technical Manager, KRIDL, Bangalore.
Name of the work	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	21.11.2014



Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.5	2.67	97.33
2	2.7		
3	2.8		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/WNo.10/KRIDL/Sp_Wa/2014-15



21.11.2014

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	Asst. Executive Engineer, Vidyanarayapura Sub Division, BBMP, Bangalore.
Agency	Technical Manager, KRIDL, Bangalore.
Name of the Work	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommāsandra) Vidyanarayapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	21.11.2014

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	$W_1 g$	2010	2011	2013	
2	Weight of basket suspended in water	$W_2 g$	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s g$	1255	1256	1258	
4	Weight of saturated surface dry aggregate in air	$W_3 g$	2008	2012	2015	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_s) g$	753	756	757	
6	Weight of oven dried aggregate	$W_4 g$	1993	1997	1998	
7	Specific Gravity	$W_4 / (W_3 - W_s)$	2.647	2.642	2.639	2.643
8	Apparent Specific gravity	$W_4 / (W_4 - W_s)$	2.701	2.695	2.700	2.699
9	Water Absorption	$((W_3 - W_4) * 100) / W_4$	0.75%	0.75%	0.85%	0.78%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/WNo.10/KRIDL/SDBC/Bitumen/2014-15

21.11.2014

BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CLIENT	Asst. Executive Engineer, Vidyanarayapura Sub Division, BBMP, Bangalore.
AGENCY	Technical Manager, KRIDL, Bangalore.
NAME OF THE WORK	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyanarayapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
SAMPLE I/D	Roads in kempanna Layout, Ward No. 10
DATE OF TESTING	21.11.2014

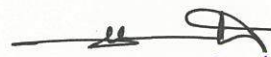


BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	474	475
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	26.00	25.00
7. Bitumen content in %	5.20	5.00
8. Average	5.10	

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Job No.: CTCE/BBMP/WNo.10/KRIDL/SDBC/Gradation/2014-15

21.11.2014

BITUMEN GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CLIENT	Asst. Executive Engineer, Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	Technical Manager, KRIDL, Bangalore.
NAME OF THE WORK	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
SAMPLE I/D	Roads in kempanna Layout, Ward No. 10
DATE OF TESTING	21.11.2014



GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	22.16	4.68	4.68	95.32	90-100
4.75	258.74	54.59	59.26	40.74	35-51
2.36	61.53	12.98	72.24	27.76	24-39
1.18	46.78	9.87	82.11	17.89	15-30
0.3	29.23	6.17	88.28	11.72	9-19
0.075	31.58	6.66	94.94	5.06	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	27.45	5.78	5.78	94.22	90-100
4.75	266.35	56.07	61.85	38.15	35-51
2.36	52.82	11.12	72.97	27.03	24-39
1.18	33.94	7.15	80.12	19.88	15-30
0.3	28.36	5.97	86.09	13.91	9-19
0.075	40.87	8.60	94.69	5.31	3-8

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21.11.2014

Aggregate Gradation Test

IS : 2386 Part I

Client	Asst. Executive Engineer, Vidyanarayapura Sub Division, BBMP, Bangalore.
Agency	Technical Manager, KRIDL, Bangalore.
Name of the Work	Improvements and asphaltting to cross roads of Kempanna Layout (Reliance Tower) in Ward No. 10 (Doddabommasandra) Vidyanarayapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/KRIDL/WO/677/2013-14 Dated: 05.03.2014
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	21.11.2014

Total Weight of Sample: **5650** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	458	8.1	8.11	91.89	90-100	
4.75	2946	52.1	60.25	39.75	35-51	
2.36	724	12.8	73.06	26.94	24-39	
1.18	459	8.1	81.19	18.81	15-30	
0.3	348	6.2	87.35	12.65	9-19	
0.075	324	5.7	93.08	6.92	3-8	

Total Weight of Sample: **5575** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	423	7.6	7.59	92.41	90-100	
4.75	2856	51.2	58.82	41.18	35-51	
2.36	758	13.6	72.41	27.59	24-39	
1.18	438	7.9	80.27	19.73	15-30	
0.3	346	6.2	86.48	13.52	9-19	
0.075	408	7.3	93.79	6.21	3-8	

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